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Suresh C. Srivastava is a tenured Senior Scientist, and Head of the Radionuclide and Radiopharmaceutical Research Division of the Medical Department at Brookhaven National Laboratory in Uptown, New York. This includes the BLIP (Brookhaven Linac Isotope Producer) Program that in the past has been instrumental in the introduction of a number of radionuclides for nuclear medicine including Tc-99m, Tl-201, I-123, and others. Dr. Srivastava received his Ph.D. in Inorganic/Analytical from the University of Allahabad. Followed a number of research/teaching appointments at LSU in New Orleans, University of Paris, Georgia Tech, and SUNY Downstate Medical Center, he joined the technetium chemistry group at Brookhaven in 1975. In 1983, he was promoted to lead the Radionuclide and Radiophamaceutical Research Program in the Medical Department, award tenure in 1985, and named Senior Scientist in 1990. He holds an academic appointment as Professor of Radiology at the State University of New York at Stony Brook.

Dr. Srivastava is active in many national and international scientific organizations and continues to serve on several professional and advisory committees. He has participated in the DOE/OHER Advisory committee, in Task Force on the NBTF and as an IAEA international expert since 1984. He assisted several institutions in Central and South America in developing their radiopharmaceutical programs. He is the recipient of the IR-100 award (1986), the Federal Laboratory Consortium Award (1988), Special Recognition Award of the Chilean Society of Biology and Nuclear Medicine (1989) and the BNL Distinguished Research and Development Award (1995). He was also named an Honorary Life member of the Association of Latin American Societies of Biology and Nuclear Medicine (ALASBIMN) in 1995. Dr. Srivastava has been active in the Society of Nuclear Medicine in many capacities. He has served on the Scientific Program Committee of a number of annual meetings and was the Vice-Chairman of this committee for 1994-1996. He was a member of the Board of Directors of the Radiopharmaceutical Science Council during 1985-87 and President in 1994. During 1989-90, he was the president of the Indo-American Society of Nuclear Medicine. He is a member of the Board of Directors of the SNM Therapy Council since 1994. He also serves as an elected member of the SNM House of Delegates (1997-present). Dr. Srivastava serves on the editorial board of *Bioconjugate Chemistry, International Journal of Biological Markers, and Revista Espanola de Medicinia Nuclear*, and has been the Guest Editor of many issues of *Nuclear Medicine and Biology*. He continues to be an active reviewer for DOE and NIH funded programs in nuclear medicine and has regularly participated in site visits of major projects as well as in NIH study sections as an Ad-Hoc member.

Dr. Srivastava's research interests include accelerator and reactor production of isotopes, radiochemistry of Tc, Sn, I, Cu, Sc and other elements of interest to nuclear medicine, labeled blood cells, radioimmunoconjugates and labeled peptides for imaging and therapy, and radiopharmaceuticals for treatment of metastatic bone pain. Dr. Srivastava has lectured widely in the US and abroad, and has organized many international symposia and workshops including a two week Advanced Study Institute on labeled antibodies in Italy in 1986, the proceedings or which he also edited. He is the inventor and co-inventor of sixteen patents and 3 statutory inventions. Two of the products he developed are either being marketed (whole blood RBC kit) or are in the process of being developed for commercialization (Sn-117m-DTPA for metastatic bone pain). He has published over 160 journal articles, 200 abstracts, 20 book chapters, and many review articles.

Future of Isotope Generators

The development at BNL of the ^{99}Mo/^{99m}Tc radioisotope generator during the late nineteen fifties revolutionized the practice of diagnostic nuclear medicine. Since then, many other radionuclide generator systems have been investigated, although none has turned out to be as widely used or successful. However, recent advances in molecular biology, PET imaging, monoclonal antibody technology, radionuclide therapy, and many new areas of research in nuclear medicine have created additional needs for readily available sources for various radionuclides. This has led to a renewed impetus for the development of novel radionuclide generator systems for both research and clinical applications.

The generators for PET radionuclides that continue to be investigated include ^{52}Fe/^{52m}Mn, ^{62}Zn/^{62}Cu, ^{68}Ge/^{68}Ga, ^{72}Se/^{72}As, ^{82}Sr/^{82}Rb, ^{118}Te/^{118}Sb, ^{122}Xe/^{122}I, and ^{128}Ba/^{128}Cs. A few of these such as ^{68}Ge/^{68}Ga, ^{62}Zn/^{62}Cu, and ^{82}Sr/^{82}Rb are available with some regularity although their domestic supply is far from continuous or reliable. Generator systems for short-lived isotopes that have been studied for SPECT imaging include ^{191}Os/^{191m}Ir, ^{195m}Hg/^{195m}Au, ^{81}Rb/^{81m}Kr, and ^{178}W/^{178}Ta. Many of these are available only infrequently for experimental use.

For maximum convenience and wide acceptance of their clinical use, it will be necessary to have sufficient quantities of relatively short-lived therapeutic radionuclides readily available, primarily at the site of use. A number of these, especially certain β^- emitters, can possibly be obtained from long-lived parents through generator systems. These include 5.1 min ^{66}Cu from 2.3 d ^{66}Ni, 55 min ^{69}Zn from 0.6 d ^{69m}Zn, 3.2 h ^{112}Ag from 0.9 d ^{112}Pd, 4.5 h ^{115m}In from 2.2 d ^{115}Cd, 3.6 min ^{128}Cs from 2.4 d ^{128}Ba, 2.3 h ^{132}I from 3.2 d ^{132}Te, 17 h ^{188}Re from 69.4 d ^{188}W, 1 h ^{212}Bi from 3.7 d ^{224}Ra/^{212}Pb, and 46 min ^{213}Bi from 14.8 d ^{225}Ra. The ^{188}W/^{188}Re generator system has recently become available for research use from Oak Ridge National Laboratory. The generator system for the " emitter ^{213}Bi has also been available on an experimental basis. The ^{115}Cd/^{115m}In generator system should be useful for applications where a short range (it emits a 300 keV conversion electron with ~1 mm range) and a short half-life are advantageous.

Some of the above-mentioned generator systems primarily produce daughter radionuclides with very short $t_{1/2}$ and high β^- energies (e.g., ^{66}Ni/^{66}Cu and ^{128}Ba/^{128}Cs). Since there is an inverse relationship between $t_{1/2}$ and β^- decay energy, there are only a few radionuclides that have both a several-day $t_{1/2}$ and a high β^- energy. To circumvent this problem, one could use the approach of labeling with an intermediate $t_{1/2}$ radionuclide that decays in-vivo to a much shorter $t_{1/2}$ daughter with high β^- emission. Since the daughter will be in equilibrium with the parent, it will exert an in-situ cytotoxic effect over a prolonged period, essentially as an "in-vivo generator". However, a number of critical questions will have to be answered before this approach can be applied successfully for radiotherapy.

This presentation will provide a discussion of the merits and drawbacks of many potential radionuclide generator systems, as well as of issues related to their future domestic supply and availability.

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